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New Orleans, La.

THE QUANTITY AND STATUS OF NAVAL-STORES TIMBER IN SURVEY UNIT NO. 1, SOUTH CAROLINA

By

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* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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THE QUANTITY AND STATUS OF NAVAL-STORES TIMBER IN SURVEY UNIT NO.1, SOUTH CAROLINA

This release is a brief presentation of the more significant naval-stores data gathered by the Forest Survey in Unit No. 1, South Carolina. The Forest Survey in the South is an activity of the Southern Forest Experiment Station, with headquarters at New Orleans, La. Its primary objects are: (1) to make an inventory of the South's present forest growing stock; (2) to formulate forest-management policies based on timber growth and the estimated future needs for forest products; and (3) to determine the present and potential contribution of the forests and forest industries to the economic welfare of the people of the South. This and other releases of advance survey information are preliminary to the publication of final, complete reports for each survey unit. In the final reports, all phases of the survey data will be shown, and will be correlated with existing and anticipated economic conditions.

The land-use classification, and all data concerning the number, size, and species of trees in this Unit, were computed from information gathered on 6400 one-quarter acre sample plots distributed throughout the area at intervals of 660 feet on parallel compass lines 10 miles apart. Six field crews of three men each, made this line-plot inventory during the period from May to August 1934. Working independently of these line-plot survey crews, other field men, by means of a still-to-still canvass, gathered data on the number, size, and character of naval-stores operations. In this canvass, made during the period from April to June 1934, the field men questioned practically 100 percent of the turpentine-still operators in the Unit.

Land-use Classes

Survey Unit No. 1, which includes twelve counties in the southern part of South Carolina, is shown in figure 1. It lies almost wholly within the Atlantic Coastal Plain, so that its highest altitudes rarely exceed 400 to 500 feet above sea level. For the most part the country is flat or gently rolling, except in the northern extremities of Lexington County where the influence of the Piedmont Plateau is felt. Owing to the area's flat relief and the sluggish nature of its numerous streams, parts of it are poorly drained; and much of this land, in its present condition of inadequate drainage, serves a better economic use in timber production than in agriculture. Its principal rivers are the Savannah, which serves as its southern boundary; the Big Salkehatchie, the Edisto, and the Santee. These flow generally in a southeasterly direction.

From the viewpoint of transportation the Unit is well served. The following railways traverse the area, making all parts of it readily accessible from both Savannah and Charleston: the Seaboard Air Line; Atlantic Coast Line; Southern; Charleston and Western Carolina; and Hampton and Branchville. A number of streams suitable for barge traffic penetrate the lower part of the Unit, while hard-surfaced roads are well distributed throughout the entire area. Probably not over 5 percent of the Unit lies more than 10 miles airline from rail, water, or highway transportation facilities.

The total land area of the Unit, classified in table 1, is approximately 5,186,900 acres, 58 percent of which is forest land. Thirty-six percent is agricultural, and the remainder falls into other nonforest classes. About 32 percent of the forest area occurs in the flatwoods, the low-lying portion of the Coastal Plain adjacent to the Atlantic Ocean; 31 percent is in the rolling uplands, which lie 40 or 50

miles back from the coast; 29 percent is in timbered swamps, bays, and poorly-drained branch heads; and 8 percent occurs in the bottomlands lying along the larger rivers and streams.

TABLE 1. -- *Area*[1] *classified by major land uses*

Land-use classes	Area in acres	Percent of total area
Forest	2,993,000	57.7
Agricultural:		
In cultivation:		
Old cropland[2]	1,441,000	27.8
New cropland[3]	6,400	.1
Out of cultivation:		
Idle[4]	197,700	3.8
Abandoned[5]	181,600	3.5
Improved pasture[6]	31,400	.6
Total agricultural	1,858,100	35.8
Other:		
Marsh, Waterways, Towns and villages, Roads, railroads, etc.	335,800	6.5
Total area	5,186,900	100.0

[1] Exclusive of coastal islands and meanderable water areas.
[2] Land cultivated at least 5 years and on which a farm crop was raised within 2 years prior to the date of survey.
[3] Land converted from forest to cropland within 5 years prior to date of survey.
[4] Cultivated land that has been idle for 2 years or more, but has not reached the abandoned stage.
[5] Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.
[6] Cleared land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

Forest Types and Turpentine History

The 2,993,000 acres of forest land in this Unit are classified in table 2 by the major forest types and by turpentine crop history. Turpentine crop histories are defined as follows:

Round crop areas: Areas on which uncupped longleaf and slash pine trees predominate and are found in sufficient quantities to justify future working.

Working crop areas: Areas bearing trees that are now being worked for naval stores.

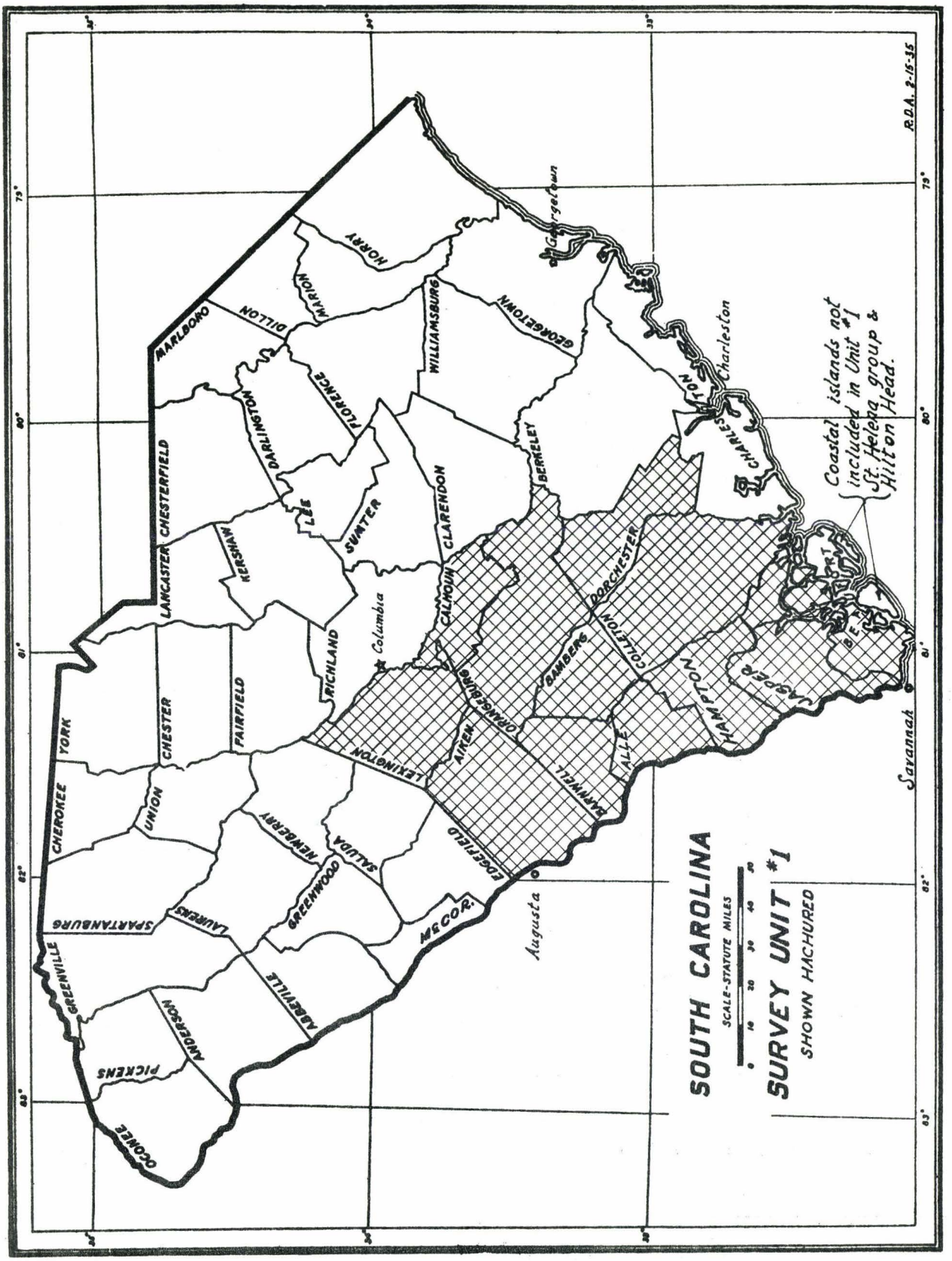

FIGURE 1. -- Geographic location of Survey Unit No. 1, South Carolina.

Idle crop areas: Areas bearing naval-stores trees on which operations were discontinued before their turpenine faces reached a height of five feet. These faces may possibly be worked again.

Worked-out crop areas: Areas bearing previously worked naval-stores trees on which operations were discontinued when the turpentine faces had reached a height of five feet or more. These areas include both crops in which the trees are resting prior to further working on back faces, and crops in which the trees are completely exhausted for naval-stores operations.

Nonturpentine areas: Areas occupied for the most part by nonturpentine species, and on which there are too few turpentine trees to justify working.

Subsequent tables indicate that at present turpentine operations are not as numerous nor as extensive in this Unit, once the heart of the naval-stores belt, as in those units that lie farther south. The nonturpentine acreage, 52 percent of the total forest area in the Unit, is noticeably large. This is a condition characteristic of the northern margin of the naval-stores belt, where loblolly pine has come in heavily and, in a measure, replaced longleaf pine reproduction on cut-over lands. Forty-one percent of the forest area is stocked with nonturpentine pine, principally loblolly. The working crop area occupies at present only 8 percent of the total forest area, but a considerable supply of round timber is suitable for future naval-stores working.

TABLE 2. -- *Forest area*[1], *classified by turpentine crop history and by forest type groups, season 1934-35*

Turpentine crop history	Forest type groups designated by predominant species			Total	Percent of total
	Longleaf and slash pine	Loblolly and other nonturpentine pine	Hardwood		
	Acres				
Round	558,600	307,800	61,900	928,300	31.0
Working	182,500	40,200	11,200	233,900	7.8
Idle	61,100	12,800	2,400	76,300	2.6
Worked-out	149,500	41,800	3,200	194,500	6.5
Nonturpentine area	7,200	821,400	731,400	1,560,000	52.1
Total	958,900	1,224,000	810,100	2,993,000	100.0
Percent of total	32.0	40.9	27.1	100.0	

[1] Exclusive of coastal islands.

Working Turpentine Area

The Unit's working turpentine area, 233,900 acres, listed in table 2 is being worked by seven classes of naval-stores producers. They are defined as follows:

Operator: A person who maintains a turpentine still in which he processes the crude gum from his own or leased timber exclusively.

Operator and farmer: An operator who spends at least half his time farming.

Operator and gum-buyer: A person who, in addition to stilling gum from his own or leased timber, buys crude gum from other producers, processes it, and sells the finished products, turpentine and rosin, in his own name.

Operator and custom-stiller: A person who, in addition to stilling gum from his own or leased timber, processes gum for other producers who market the turpentine and rosin in their own names.

Operator, gum-buyer, and custom-stiller: An operator who is also a gum-buyer and a custom-stiller.

Gum-producer-seller: A person who maintains no still, but works his own or leased timber for crude gum, which he sells to stillers.

Gum-producer-shipper: A person who maintains no still, but works his own or leased timber for crude gum which, when custom-stilled, he markets in his own name.

Table 3 shows the owned and leased area that each class of naval-stores producer worked during the 1934-35 season. Nearly 70 percent of the working naval-stores area in the Unit was leased. Small producers, who maintained no stills, cupped 32 percent of the working acreage.

TABLE 3. -- *Owned and leased turpentine working acreage,*[1] *classified by types of naval-stores producers, season 1934-35*

Types of naval-stores producers	Gross working acreage			Percent of total
	Owned	Leased	Total	
	Acres			
Operator	23,900	97,100	121,000	51.7
Operator and farmer	2,300	16,600	18,900	8.1
Operator and gum-buyer	1,200	13,300	14,500	6.2
Operator and custom-stiller	-	-	-	-
Operator, gum-buyer and custom-stiller	500	4,500	5,000	2.1
Gum-producer-seller	40,200 [2]	26,900 [2]	67,100 [2]	28.7
Gum-producer-shipper	3,700 [2]	3,700 [2]	7,400 [2]	3.2
Total	71,800	162,100	233,900	100.0
Percent of total	30.7	69.3	100.0	

[1] Exclusive of coastal islands.

[2] Estimated from information furnished by still operators.

Turpentine Condition of Trees

Table 4 classifies the turpentine condition of individual longleaf and slash pine trees regardless of the crop history of the stands in which they are found. Turpentine conditions of trees, shown here in 2-inch diameter classes, are defined as:

Round trees: Longleaf and slash pine trees that have never been worked for naval stores.

Working trees: Trees that are now being worked for naval stores.

Idle trees: Trees that have been worked for naval stores in the past, but are not now being worked, although their naval-stores productivity has not been exhausted. Such trees may have one or more future faces.

Worked-out trees: Trees that have been worked until their usefulness as naval-stores producers has been exhausted.

Approximately 45 million, or 71 percent, of the longleaf and slash pine trees in the Unit are round and between 3.0 and 8.9 inches in diameter. These trees form the nucleus from which future naval-stores production must develop; hence excessive cutting or turpentining of such immature trees, will reduce the growing stock upon which the naval-stores industry must depend.

TABLE 4. -- *Longleaf and slash pine trees*[1], *classified by the diameter and turpentine condition of individual trees, season 1934-35*

Tree diameter 4½ feet from the ground[2]	Turpentine condition of trees				Total	Percent of total
	Round	Working	Idle	Worked-out		
Inches	*Thousands of trees*[3]					
3.0 - 4.9	20,318	-[4]	-[4]	-[4]	20,318	32.4
5.0 - 6.9	14,692	-[4]	296	-[4]	14,988	23.9
7.0 - 8.9	9,744	1,415	862	241	12,262	19.5
9.0 - 10.9	4,346	1,350	932	257	6,885	11.0
11.0 - 12.9	2,376	868	839	267	4,350	6.9
13.0 - 14.9	997	431	511	222	2,161	3.4
15.0 - 16.9	424	154	241	68	887	1.4
17.0 - 18.9	212	67	148	32	459	.7
19.0 and larger	276	58	141	29	504	.8
Total	53,385	4,343	3,970	1,116	62,814	100.0
Percent of total	85.0	6.9	6.3	1.8	100.0	

[1] Exclusive of trees on coastal islands.

[2] For working, idle, and worked-out trees this diameter is calculated from the diameter measured 10 feet from the ground so as to correct for the influence of turpentining.

[3] To convert to full number of trees add "000".

[4] The number of trees in these classes is negligible.

TABLE 5. -- *Working turpentine cups*[1] *classified by year of working and diameter of working trees, season 1934-35*

Tree diameter 4½ feet from the ground [2]	Years of working						Total	
	1st and 2nd years		3rd and 4th years		5th year and up			
Inches	Thousands [3] of cups	Percent	Thousands [3] of cups	Percent	Thousands [3] of cups	Percent	Thousands [3] of cups	Percent
Under 7.0 [4]	---	---	---	---	---	---	---	---
7.0 - 8.9	845	34.5	514	30.2	119	13.6	1,478	29.4
9.0 - 10.9	698	28.5	482	28.3	234	26.8	1,414	28.1
11.0 - 12.9	450	18.4	338	19.8	231	26.4	1,019	20.3
13.0 - 14.9	283	11.5	215	12.6	190	21.8	688	13.7
15.0 - 16.9	103	4.2	74	4.4	55	6.3	232	4.6
17.0 - 18.9	39	1.6	26	1.5	29	3.3	94	1.9
19.0 and larger	32	1.3	55	3.2	16	1.8	103	2.0
Total	2,450	100.0	1,704	100.0	874	100.0	5,028	100.0
Percent	48.7		33.9		17.4		100.0	

[1] Exclusive of cups on trees of coastal islands.
[2] Calculated from the diameter measured 10 feet from the ground, in order to correct for the influence of turpentining.
[3] To convert to full number of cups add "000".
[4] The number of cups on trees under 7.0 inches in diameter is negligible.

As shown in table 5, on the preceding page, the total number of working turpentine cups in the Unit is 5,028,000. These cups hang on 4,343,000 trees, an average of 1.16 cups per tree. Inasmuch as the number of working cups is relatively small, the Survey's sampling data were insufficient to permit an accurate tabular presentation both by year of working and by diameter of trees. Accordingly, table 5 merely classifies the working cups by diameters of trees and two-year working groups. It indicates that during the past few years the tendency of producers in this Unit has been to cup more intensively the trees under 9.0 inches in diameter.

Table 6, prepared as a supplement to table 5, shows the working cups in the Unit classified only by year of working.

TABLE 6. -- *Working turpentine cups*[1], *classified by year of working, season 1934-35*

Year of working	Thousands of cups[2]	Percent of total
First	1,107	22.0
Second	1,343	26.7
Third	1,004	20.0
Fourth	700	13.9
Fifth	463	9.2
Sixth and up	411	8.2
Total	5,028	100.0

[1] Exclusive of cups on trees of coastal islands.
[2] To convert to full number of cups add "000".

Table 7 shows the number of cups that each class of naval-stores producer worked on owned and leased land during the 1934-35 season. The gum-producer-sellers and gum-producer-shippers were significant factors in the production during this season. Approximately 380 of them worked 26 percent of the total number of cups in the Unit, which means that many a small farmer turned his hand to gum producing as a means of increasing his cash income.

Although table 8 does not illustrate the complete data, somewhat more than half of the 1,107,000 first-year cups hung during the 1934-35 season were on front cupped trees; that is, trees that had never before been worked for turpentine. The remainder were on back-cupped trees. Column two of table 8 shows the percentage distribution of cups on front-cupped trees, classified by two-inch diameter classes; column three shows the corresponding percentage distribution of cups on back-cupped trees, also classified by the same diameter classes.

Gum Naval-stores Production 1933-34

Table 9 summarizes the croppage and production for the season 1933-34 by the several classes of naval-stores producers. The production for 1934-35 could not be taken because it was midseason when the survey was made. This statement of 1933-34 croppage and production is based upon the supplementary still-to-still canvass mentioned above. It was often possible to confirm the production data by sales records and factors' accounts, but it was not possible to check the 1933-34 croppage figures that were furnished by individual producers. Accordingly, the data on average production per crop in naval-stores units for 1933-34 cannot be verified by the Survey. They are presented here for what they may be worth.

TABLE 7. -- *Turpentine producers and working turpentine cups on owned and leased land*[1], *classified by types of naval-stores producers, season 1934-35*

Types of naval-stores producers	Number of producers[2]	Working cups			
		On owned land	On leased land	Total	Percent of total
		Thousands of cups[3]			
Operator	27	588	2,288	2,876	57.2
Operator and farmer	8	55	342	397	7.9
Operator and gum-buyer	6	30	312	342	6.8
Operator and custom-stiller	-	-	-	-	-
Operator, gum-buyer, and custom-stiller	6	10	80	90	1.8
Gum-producer-seller	360[4]	714[4]	473[4]	1,187[4]	23.6
Gum-producer-shipper	18[4]	66[4]	70[4]	136[4]	2.7
Total	425[5]	1,463	3,565	5,028	100.0
Percent of total		29.1	70.9	100.0	

[1] Exclusive of coastal islands.

[2] With the exception of the gum-producer-sellers and gum-producer-shippers, the number of producers shown is the number actually visited from April to June, 1934 in the still-to-still canvass. The number of gum-producer-sellers and gum-producer-shippers is the estimated number working during the naval-stores year 1933-34; the number for 1934-35 is approximately the same.

[3] To convert to full number of cups add "000".

[4] Estimated from information furnished by still operators.

[5] In addition to the 425 producers making crude gum, there were 4 that stilled gum produced by others, but did not themselves work any timber.

TABLE 8. -- *Percentage of first-year turpentine cups on front-cupped and back-cupped trees*[1], *by diameter classes, season 1934-35*

Tree diameter 4½ feet from the ground[2]	On front-cupped trees	On back-cupped trees
Inches	*Percent*	*Percent*
Under 9.0	41.0	22.9
9.0 - 10.9	30.0	25.7
11.0 - 12.9	17.8	23.1
13.0 - 14.9	8.0	17.1
15.0 - 16.9	2.4	7.3
17.0 - 18.9	.8	2.3
19.0 and larger	-	1.6
Total	100.0	100.0

[1] Exclusive of trees on coastal islands.

[2] Calculated from diameters measured at 10 feet from the ground so as to correct for the influence of turpentining.

TABLE 9. -- *Naval-stores croppage and production* [1], *classified by types of naval-stores producers, season 1934-35*

Types of naval-stores producers	Number of producers [2]	Thousands of working cups [3]	Production in naval-stores units [4]	Average production per crop in naval-stores units [4]
Operator	27	2,704	10,030	37.1
Operator and farmer	8	345	1,190	34.5
Operator and gum-buyer	6	312	1,090	34.9
Operator and custom-stiller	-	-	-	-
Operator, gum-buyer, and custom-stiller	6	102	330	32.4
Gum-producer-seller	360 [5]	1,077 [5]	2,910 [5]	27.0
Gum-producer-shipper	18 [5]	122 [5]	360 [5]	29.5
Total	425 [6]	4,662	15,910	34.1

[1] Exclusive of coastal islands.

[2] The number of gum-producer-sellers and gum-producer-shippers applies to the naval stores years 1933-34. Those of other types of producers apply strictly to the naval-stores year 1934-35, but are approximately correct for 1933-34.

[3] To convert to full number of cups add "000".

[4] A naval-stores unit is made up of one 50-gallon barrel of turpentine and three and one-third 500-pound (gross) barrels of rosin.

[5] Estimated from information furnished by still operators.

[6] In addition to the 425 producers making crude gum, there were 4 who stilled gum produced by others, but did not themselves work any timber.

Summary

South Carolina Survey Unit No. 1 covers an area of nearly 5,187,000 acres, of which 2,993,000, or approximately 58 percent, is forest land. Practically 48 percent of the forest acreage bears a sufficient quantity of turpentine timber to classify it as naval-stores land. The total number of turpentine trees is nearly 63 million; more than 44 million, or 71 percent of these, are round and between 3.0 and 8.9 inches in diameter. The total number of working trees during 1934-35 was 4,343,000; total working cups, 5,028,000; total virgin cups, 1,107,000, a decrease of more than 200,000 under the previous naval-stores year. Only 47 stills are located in the Unit. The bulk of the crude gum (70.9 percent of the working cups in 1934-35) comes from leased land. The average production per crop in 1933-34 was approximately 34 barrels.